Effect of Green Management Educational Program on Nurses' Sustainability Management Knowledge in A Selected Hospital, Nurses' Demographics Correlate.

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Abstract

Background: the current drive towards sustainability is putting pressure on organizations and their managers worldwide to apply all measures that can be managed, monitored, and analyzed in a unified custom using some common resources and information under different types of administrative standards. This study **aimed** to assess the effect of green management educational program on nurses' sustainability management knowledge, nurses' demographics correlate. **Methods**: a quasi-experimental research design was used. **Sample**: A purposive sample of 50 different categories of the nursing managers' positions was included in the study. **Setting**: this study was conducted in Obstetric and Gynecological Hospital at Ksr Elaini hospitals. **Tool**: An adapted Green Management Knowledge Questionnaire (GMKQ) was utilized to gather the data. Results: The key **findings** of this study were: there was a highly statistically significance difference in the group subject scores before and after program implementation, and there was no significance difference in their experience, qualifications with their knowledge level. Finally, there were not any demographic predictions/ influencing the knowledge level improvement. Conclusion: Entirely nursing managers' necessity to be mindful of the green management concept, his/ her role as a manager, and how to apply this role. This research **recommended** a supplementary study on a large scale, including all Egyptian university and governmental hospitals, will be necessary to weigh the level of knowledge at all operational, supervisory, and strategic levels. An enlightening training program must be applied to enhance nursing managers' knowledge concerning green management as a key part of sustainability in general and testing its impact on organizations and patient outcomes.

Keywords: Green Management, Nurse Managers, Sustainability Knowledge

Introduction

The current corporate environment is unstable because of the global pandemic, geopolitical turmoil, chemical pollution, climate change, management difficulties, and over utilization of limited resources. Climate change poses significant challenges, particularly in its detrimental impact on human health, resulting in a rise in related disorders that strain healthcare systems **(Alfred., & Adam, R. 2019).** The importance of strengthening the public health system, emergency response programs, and pertinent research to achieve a sustainable environment has been underscored by the World Health Organization (WHO). The healthcare sector is anticipated to have a significant role in addressing the impacts of climate change on human health **(Abd-elmonem, Rashed, & Hasanin, 2022) & (Building Design and Construction: Oak Brook, USA, 2003).**

There is a requirement for The concept of green healthcare involves the simultaneous reduction of adverse effects on individuals and the environment, as well as the elimination of diseases, by acknowledging the connection between human well-being and environmental health. **(Szklo, Soares, Tolmasquim, 2014).**

Since its declaration in 1972, sustainability has been widely applied to healthcare. Scientists and institutions are striving to enhance the effectiveness of energy, water, and material usage in buildings and their surroundings, while minimizing the negative effects of structures on human health and the environment. This is achieved through improved planning, design, construction, operation, maintenance, and demolition processes. This is accomplished within the realm of the environmentally conscious healthcare and management sector**. (Business Today. India, 2021).** Green healthcare makes medicine, doctors, patients, and the environment more sustainable in the future. These perspectives

highlight the significance of implementation of environmentally friendly practices in healthcare to improve the overall health and wellness of persons, societies, and the natural surroundings.

Teixeira, Jabbour, & Jabbour, (2012). proposed that the implementation of green healthcare facilitates promoting a state of well-being by mitigating the ecological consequences and assuming accountability for sustainable approaches to disease treatment. Although globally recognized and unique in the healthcare sector, the notion of green management necessitates empirical testing even in smaller units. Hence, the primary objective of the present study was to investigate the impact of implementing a green management program on the perception and knowledge of nurses.

The effects of the healthcare sector and the conflicting climate on human beings and the environment arise from the resource-intensive characteristics inherent in the industry. Healthcare organizations can be considered as institutions that consume a significant amount of energy. In response to this, the World Health Organization (WHO) created the notion of a 'green healthy environment.' Healthcare organizations have been trying to uphold the provision of high-quality care services, mitigate the transmission of diseases, and implement sustainable management practices in hospitals **(Dhillon, V.; Kaur,2015**) & (Shaabani, Najar, Shafiee, Meraji, Hooshmand, 2020). In order to manage energy consumption, communication practices, conflict resolution, waste disposal, leadership styles, and overall risk reduction within hospital environments effectively, various management programs have been implemented. These programs are centered around the concept of green management, which aims to promote environmentally sustainable practices **(Research and Markets, 2021)** & **(National Health Expenditure, 2020).**

The concept of green healthcare includes the notion of Sustainable development for the environment, indicating that it offers care services that are environmentally friendly and have the dual objective of boosting individual health and benefiting the community **(Howard, 2023).** Moreover, the implementation of environmentally friendly healthcare practices has the potential to generate economic benefits through waste reduction and decreased operational expenses.

Additionally, it can enhance the overall value of healthcare establishments and foster greater consumer consciousness regarding the significance of sustainability. In addition, encouraging the development of a sustainable ecosystem seeks to further the larger good **(Karliner & Guenther, 2021) & (Mustapha, Manan, & Alwi, (2017).**

Nevertheless, despite the forefront mentioned benefits, the successful execution of green management necessitates the presence of exceptionally skilled leaders. Additionally, it is worth noting that there is a scarcity of empirical studies investigating the use of green management within healthcare settings. Currently, the preservation of sustainability poses a significant challenge within the healthcare sector. Sustainability is defined as the safeguarding and enhancement of the human environment, which has a profound impact on the welfare of individuals and global economic progress. It is a pressing global concern and a responsibility that falls upon all governments. In line with this, the Brundt Land Report stated that as the "environment" and "development" are intertwined in a causal system, they cannot be separated **(National Intelligence Council, 2021).**

Finally, it can be concluded that, Green management refers to practices aimed at manufacturing environmentally friendly products and reducing environmental effects. This is achieved by implementing green production methods, green research and development initiatives, and green marketing strategies. The enhancement of the environment is seen as a fundamental objective of green management, as stated by Darnall, Jolley, and Handfield (2018). Hence, this study aimed to assess the effect of an educational program targeting nurse managers in the field of green management. This evaluation included examining the relationship between the participants' demographic characteristics and their knowledge of green management and measuring the effect of the program various phases, such as program design and implementation, on their knowledge acquisition.

Operational definitions:

1- Nurse Managers: all managerial positioned Nurses and the prepared nurse for this position such as: charge nurse, seniors. etc……).

2- Green management program: a designed program included all items that improve nurses' knowledge regarding green management as a main part of sustainability and will be measured by adapted Green Management knowledge Questionnaire.

Aim of the study:

This study aimed to assess the effect of green management educational program on nurses' sustainability management knowledge, nurses' demographics correlate

Research hypothesis:

H1: nurses' knowledge score after given the green management program(μ1) is higher as compared to the nurses' knowledge score before the green management program *(μ2), (H1: μ1 > μ2).*

Subjects and Methods

Research Design:

The current study employed a quasi-experimental research design. A quasi-experimental design refers to a specific research methodology. To elucidate this approach, it is crucial to comprehend the distinction between experimental and quasi-experimental methods. A quasi-experiment, as the name implies, closely resembles an actual experiment. In a quasi-experimental design, researchers do not employ random selection when choosing specific elements, such as volunteers, which distinguishes it from other research methods. In genuine experiments, the selection is randomized. Both types of experiments involve the manipulation of an independent variable to observe the cause-and-effect relationship with the dependent variable. However, quasi-experimental design is not as robust as an actual trial because of the presence of confounding variables that are inherent in preselected individuals or materials **(Eckelman, Sherman, Estimated, 2018).**

Setting:

This research was carried out at obstetric and gynecological hospitals which affiliated to Cairo University Hospitals, Cairo City. The research conducted in all hospital departments (inpatient ward and hot areas e.g. ICUs) in that hospital. The hospital capacity more than 200 bed for different obstetric and gynecological specialties and more than 150 nurse with different categories ranging from nurse executive to the intern students.

Participants:

A purposive sample of all (about 50) male and female head/ charge/ supervisor/executive nurse managers asked to participate in the current study. As well as have corresponding to the following inclusion criteria preferred in the current study:

- Bachelor and technical institute only
- Employed on a full-time basis
- Maintain ongoing employment at the hospital for a minimum of 5 years.
- The age not less than25 years/ not more than 50.
- first-time course-takers

According for this formula, sample size was calculated:

Sample Size n = N * [Z2 * p * (1-p)/e2] / [N – 1 + (Z2 * p * (1-p)/e2]
- N = Population size,
- Z = Critical value of the normal distribution at the required confidence level,
- p = Sample proportion,
- e = Margin of error

Instruments of Data Collection:

Two tools had been adapted to collect data relevant to the current study:

1- A concise demographic questionnaire was developed to gather data on variables including the participant's gender, department, age group, and prior attendance of this program.

2- Green Management Knowledge Questionnaire (GMKQ), was adapted from (Karliner 2021) and had been utilized in the current study to measure nurses' knowledge as a dependent variable, this instrument to assess the knowledge of the nurses regarding green management before and after program implementation. Its consisted of 6 subcategories (52 total items) 1- Manager Role(14 item)2- Employee participation (7 items) 3- Education& training(4 items) 4- Continuous improvement (8 items) 5- Environmental performance(13 items) 6- Monitoring activities/systems (6 items)

The questions were scored as "1" for know, and "zero" for not know .Total skills score was calculated as follows:

- Satisfactory level (≥ 75%) was ranged from (39-52score).
- Unsatisfactory level (<75%) was ranged from (0-38 score)

Tool Validity and reliability

Three experts in the field of nursing administration examined the study's face and content validity. The suggested modifications were formulated. And to test internal consistency Cronbach's Alpha was clarified (0,79) which is mean that the developed tool was internally consisted

Ethical Consideration:

Approval from the ethics committee was acquired in October 2023. Participation in the study is voluntary, and each participant could leave at any time. The subjects have provided informed consent. Data confidentiality and subject anonymity are guaranteed by encoding all information. The collected data will be only utilized for research purposes and will not be employed in any subsequent studies. All collected data will be safeguarded and will have no impact on students' yearly evaluation in any way. The compiled database and the findings of the ongoing investigation will be integrated into the college's educational curriculum.

Procedure:

Upon receiving the official authorization and ethical clearance to proceed with the proposed study, the implementation will be carried out in two distinct phases:

The initial phase involves examining the data of the chosen nurses employed at the designated hospital. The contact details of the nurses who met the specified criteria for inclusion were acquired. The participants were provided with a clear and concise explanation on the objectives, characteristics, and advantages of the study. A pilot study was done with a sample size of 6 participants, which represents 10% of the total population. The purpose of this study was to determine the required time for data collection and to assess the practicality, objectivity, and clarity of the study instruments. The nurses' inquiries on the interpretation of the statements and the process of completing the replies were thoroughly addressed.

The Second Part started by grouping the selected participants as a one group every day (this group about 4-5 member changed daily according to their schedule of attendance) and the researcher started to discuss with them the meaning of green management as a new concept. This discussion occurred in the lecture room in the hospital for about 2 hours daily (except Friday and Saturday) for about two weeks (about ten sessions). Group Discussion method of teaching was adopted a teaching method with PowerPoint presentation covering the program content including: program aimed to educate, motivate, and engage healthcare professionals to adopt best managerial and environmental practices that increase operational efficiency and support and environmentally sustainable system that improves the health of patients, staff and the whole organization. Focusing on certain areas as: Practical, efficient, sustainable operational improvements, safety/occupational exposure, worker morale issues, regulatory compliance, employee engagement and retention, positive relations leadership support, team development, gather information and confidentiality, track and report, water& conservation efficiency, energy conservation , innovation, waste management. Improved indoor air quality, Connection to nature (daylight/ views), Choice & Control (light and ventilation), Social Support and finally Elimination of Environmental Stressors.

After the sessions had been finished, they were handed the questionnaire to collect the data in March, 2023 and compare with the baseline data that handed before the implementation of the program. Data had been started to be collected pre program implementation in Jan., 2023 for about one month after ethical approval was obtained and the program implemented in February, 2023

Data Analysis

Statistical analysis was done by using (SPSS) Version 22 statistical software package. Data were presented using descriptive statistics in the form of frequencies, Means and standard deviation. Independent t-test was for comparisons between variables. Cronbach' alpha to assess internal consistency of the developed tool. Statistical significance was considered at p-value <0.05 Correlation Coefficient (r) test and

independent t test was used to test the scores difference pre and post program and regression for testing predictors of age, gender and qualification on nurses knowledge scores regarding green management closeness of association& differences among variables.

Result

The study's results were organized and presented in three primary sections:

Section I: Proportional allocation of socio-demographic parameters within the analyzed sample.

Section II: Disparities in overall green management ratings between the pre- and post-group (addressing research inquiries)

Section III: examines the correlation between the participant's educational level, experience, age, and their level of knowledge. The variation seen among the analyzed sample based on their qualifications and their overall knowledge score. (an additional discovery)

Table 1: Showed that, 78% of the studied sample were female, mean of their age was 34 years old, approximately all of them have no any previous courses related to green management,

and the highest percentage of them graduated from technical nursing schools (58%).

Table 2: clarified that the majority of participants (82%) had unsatisfactory knowledge level, while only 18% were considered as knowledgeable about green management.

Table 3: showed that the participants receiving the green management program had higher scores (post program) (M=47.8, SD=7.5) than before (preprogram)(M=24.3, SD=5.8), t(-17.48), P = .000.

Table 4: illustrated that there was no statistically significance correlation between studied group gender and their total knowledge scores (t= -.659, p= .514).

Table 5: demonstrated that, among the group under study, there was no statistically significance variation in knowledge scores according to their qualifications (f=.168, p=.845).

Table 6: confirmed that age, gender and qualification are not predicting/ influences variables affecting total nurses' knowledge level (B=.058 p=.61) (B=1.852 p=.582) (B=-1.29 p=.568) respectively, and the total prediction illustrated (-.021).

Section I: Proportional allocation of socio-demographic parameters within the analyzed sample.

Table (1): Frequency distribution of socio-demographic data of the studied sample (n= 50)

Items		No.	%
gender	male	11	22
	female	39	78
qualification	technical	29	58
	Bachelor	18	35
	master	3	6
Previous courses	yes	0	0
	No.	50	100
Age	Mean + SD 34.32±12.03		

Section II: difference in the subject scores (answering research question)

Table (2): Nursing Managers' Level of Knowledge Regarding Green Management (pre program)

Level of knowledge	No	%
Unsatisfactory level	41	82
Satisfactory level	9	18

Table (3): Differences in total green management scores among pre& post Group (independent t test) (n=50)

Group	N	Mean	Std. Deviation	t	p
pre	50	24.3400	5.80503	-17.485	.000
post	50	47.8800	7.54480		

Table (4): correlation between studied group gender and their total knowledge scores

gender	N	Mean	Std. Deviation	t	p
1.00	11	34.4091	13.73788	-.659	.514
2.00	39	36.5897	13.60332		

Table (5): Difference among the studied sample in relation to their qualifications and their total knowledge score (n = 50)

	N	Mean	Std. Deviation	f	p
Technical	29	36.7241	14.63329	.168	.845
Bachelor	18	35.4722	12.06053		
Master	3	34.0000	13.66748		
Total	50	36.1100	13.59359		

Table (6): influences/ predictors of age, gender and qualification on nurses knowledge scores regarding green management

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Mean Square	R Square	Adjusted R Square	Std. Error of the Estimate
	B	Std. Error							
(Constant)	32.740	7.686		4.260	.000	61.458	.010	-.021	13.73
age	.058	.116	.051	.502	.617				
gender	1.851	3.352	.057	.552	.582				
qualification	-1.298	2.268	-.058	-.572	.568				

Discussion

Although there are researches about sustainability and green management had been conducted in Egypt, only a few studies examined nurses' knowledge regarding green management. Even if Egypt began to apply green hospitality in 2020 as a main part of sustainability, the current study is one of the initial studies in Egypt that focused on analyzing nurses' knowledge regarding green management.

Green management denotes to the comprehensive implementation of innovative practices throughout an organization to achieve sustainability, minimize waste, uphold social responsibility, and gain a competitive edge. This is accomplished through ongoing learning and development, as well as the integration of environmental goals and strategies that align with the overall objectives of the organization.

Green management refers to the implementation of strategies that aim to create ecologically sustainable products while minimizing the negative effects on the environment through eco-friendly production methods, research and development, and marketing.Improved environment considered basic goals of green management, **(Sezen, & Çankaya, 2018).** Therefore, the aim of this study was to assess the educational program for nurse managers about green management with correlations to their demographics characteristics and assessing knowledge regarding green management through program phases, designing and implementing educational program at work.

Discussion of the study was presented in the following sequence. The first part was concerned with personal data of studied participants. The second part alarmed about difference in nurses' knowledge regarding green management (pre and post program implementation). The third part was focused on Correlation between study variables and the participant personal characteristics (additional finding).The present study showed that, the distribution of personal data of the studied nursing managers; about more than two thirds of the studied participant were female, their age mean about 34years old, as regarding to their

qualifications; more than have of them graduated from technical institute, and finally all of them did not receive any training program regarding green management.

The present study illustrated that, there was a highly statistically significance difference of nurses' managers knowledge level throughout post program implementation, which indicated that the program had a positive effect on improvement of nurse managers knowledge level. This difference may be due to the novelty of the concept that not well known, no any program related to this issue was discussed before with the staff. Also this disparity could be arised from insufficiently updated training, a lack of employee engagement in eco-friendly initiatives, a deficient regulatory framework within the organization's administration, inadequate financial resources for procuring environmentally sustainable products, or ambiguous environmental regulations.

Additionally, the hospital administration lacks the authority to implement operational strategies that effectively motivate its staff to actively participate in and support environmentally friendly healthcare practices, as outlined in the plan. There is a lack of dedication and participation from senior executives in implementing environmental friendly healthcare activities, such as setting and maintaining clear guidelines for work practices or developing environmental programs.

This study was congruent with the study that conducted by Elgarf, Eid and Rashad (2023) which aimed to assess the effect of nursing staff green management program on their knowledge and patient safety. By a Quasi experimental research design included (60 nurse) and (40 patients). The result found that there was a highly statistically significant difference in the staff knowledge pre and post program implementation and it had a positive correlations between total knowledge and total patient safety pre& immediately post and follow up (after3months) the program. The author concluded and recommended that: Ongoing educational and training programs are needed for nursing management staff about green management which directly and indirect affect patients' safety. This study result may be similar to the current result could be due to the similarity between participants in both studies and the same culture that not introduce the concept of green management (both were conducted in Egypt)

The present study was congruent with Wahl et al., (2022), who denoted that green management wasn't only among managers but also can be applied among nursing schools. After implementing green management program, the researcher stated that more than two thirds of the patients have high total level of safety immediately post program, but this number decline by the time after executing the program. This result enhancement correlated with the improved nursing students' knowledge regarding Green management. Green management is crucial for managers for many reasons; Managers are expected to utilize resources in a rational, prudent, and responsible manner. They should also prioritize environmental protection and strive to decrease the quantities of air, water, energy, and other materials included in the end products that consumers consume. Additionally, managers should promote recycling and reusing of these commodities. From an ethical or normative standpoint, the responsibility for implementing environmentally-friendly practices is absolute and unconditional. The financial aspect of being environmentally conscious is only partially relevant to one's behavior. Utilizing daily safety huddles as a means of acquiring knowledge through practical work experience.

In addition to, this study incongruent with a research conducted by **(Mustapha, Manan'&Alwi2017).**The study clarified that, organizations settled by small enterprises, managers' with good intentions frequently incur barriers to superior environmental performance. During the period of beginning to promote voluntary adoption of sound environmental practices as apart of green community, he examined managers' attitudes, norms, and knowledge to implement green environmental management program. He found that managers within the simple structures of these small and medium firms are responsive to attitude and voluntarily established environmental program that increased the success of organization implementation of energy conservation and recycling practices. The author concluded that, An applications of the findings to future research on small and medium enterprises as well as direct practical applications of our results are discussed.

The study that framed by Teixeira et al. (2022) on the connection between mangers training and green management in Brazilian companies, however, there are contain some contradictions with the current result. Nine case studies were conducted at well-known ISO 14001 certified businesses in the relevant market niches. We conducted multiple interviews with the managers. One of the main contributions was a proposal for a theoretical framework that connects the characteristics of environmental training with the stages of green management progression. The managers concluded that the elements that seem to link and transform environmental training into a more proactive approach to green management are the suggested theoretical framework, which includes organizational culture and teamwork, top management support, and more technical green management practices.. The key finding established a significant correlation between managers' environmental practices and green management training. Put simply, the greater the extent to which recommended green management activities are adopted, the more advanced the green management practices likely to be among managers.

In addition to, contradiction with this study which attempted to evaluate the association between green human resource management techniques and organizational innovativeness including all available head nurses (60). (Abd El-Monem, Rashed& Hasanin, 2022) asserted that head nurses hold the position of a primary managerial level. The study employed a descriptive Correlational research design. The Green Human Resource Management Strategies Questionnaire was employed to assess the perception levels of head nurses towards green human resource management strategies. The findings revealed that slightly over two-thirds of head nurses held a high perception level towards these strategies, and the majority of them perceived a high level of organizational innovativeness. The analysis reveals a strong and statistically significant association between the head nurses' opinion of green management and the overall level of organizational innovativeness. Ultimately, the authors suggest that Nurse Managers should establish a connection between green rewards and compensation in order to incentivize environmentally friendly behavior and

performance. Additionally, further research is needed to identify the obstacles that may arise when implementing green management strategies in healthcare organizations.

In relations to the current study, many organizations seek to support their managers' collaborative, social responsibility and client collaborations, in this research the author (Vaccaro&Echeverri,2020) Decided to confirm if the corporate transparency affect managers' preparedness and knowledge to undertake pro-environmental collaborative as a crucial part of green management. It centers on how managers view the utility's level of transparency and its propensity to adopt environmentally friendly practices. The main Results showed that employees of their transparency as a main part of sustainability affect their willingness to collaborate in environmental green management training, and that the degree of perceived transparency of the utility is related to managers' environmental awareness.

This paper aimed to offer an all-encompassing elucidation of green management. In order to establish a comprehensive definition, a systematic exploration of the literature on green management is conducted from three distinct angles. Firstly, the historical evolution of this concept is traced. Secondly, the actual practices of green organizations are examined, with a specific focus on a company that has been acknowledged for its exceptional sustainability efforts. Lastly, the latest advancements in critical theory pertaining to environmental concerns and business are reviewed **(Alfred& Adam, 2019).**

Furthermore, this study was aligned with the research conducted by Jemai et al. (2020). The primary aim of this study was to establish an efficient network by integrating environmentally friendly practices into the design of a dynamic healthcare supply chain management system. This was done to ensure the delivery of environmentally friendly tasks while also reducing the overall costs associated with the dynamic green chain. Furthermore, the proposed model facilitates the fulfillment of patient expectations and the establishment of a proficient network. The model is assessed and verified by computational testing, with a particular focus on a case study conducted in South Korea. The quantitative findings demonstrate that effective

waste management within the context of supply management can significantly impact the environment.

Concerning the imperative necessity of putting the idea of green management into practice and researching it, a tripartite method is used in this exploratory examination of the literature to develop a solid definition of the term "green management." Examining green management from the three previously described perspectives uncovered certain linguistic and conceptual consistency issues. The definition of green management that was suggested includes elements that were shared by the three viewpoints. A thorough conceptualization of green management as a novel idea is the review's final output. Researchers and nursing managers can both benefit from the tripartite approach's identification of certain commonalities, which suggests that green management elements should be applied in health care setting supervised by all managers at different levels. The systematic approach produced a thorough conception and testing any new concept that can assist and organize future research efforts around a common conceptualization to emerge a new concept. Green management has never been comprehensively reviewed from these three angles. **(, Teixeira,, Jabbour, Sousa, 2022).**

V. Conclusion recommendations:

The present study determined that a substantial number of the nurse managers who were part of the sample showed an improvement in their knowledge after the implementation of the green management program. Furthermore, there was no statistically significance difference observed between their level of knowledge and their experience and qualifications. The present study's outcomes led to the following assumptions for recommendations: To comprehensively evaluate the knowledge levels of all management and administrative personnel, it will be imperative to conduct an extensive study encompassing all Egyptian university hospitals. An educational training program will be implemented to expand the understanding of green management for all hospital staff medical and non medical not the managers only, which is a crucial aspect of overall sustainability. This program recommended to expand effect of green

management on the organization as a whole as reflected by their knowledge improvement.

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